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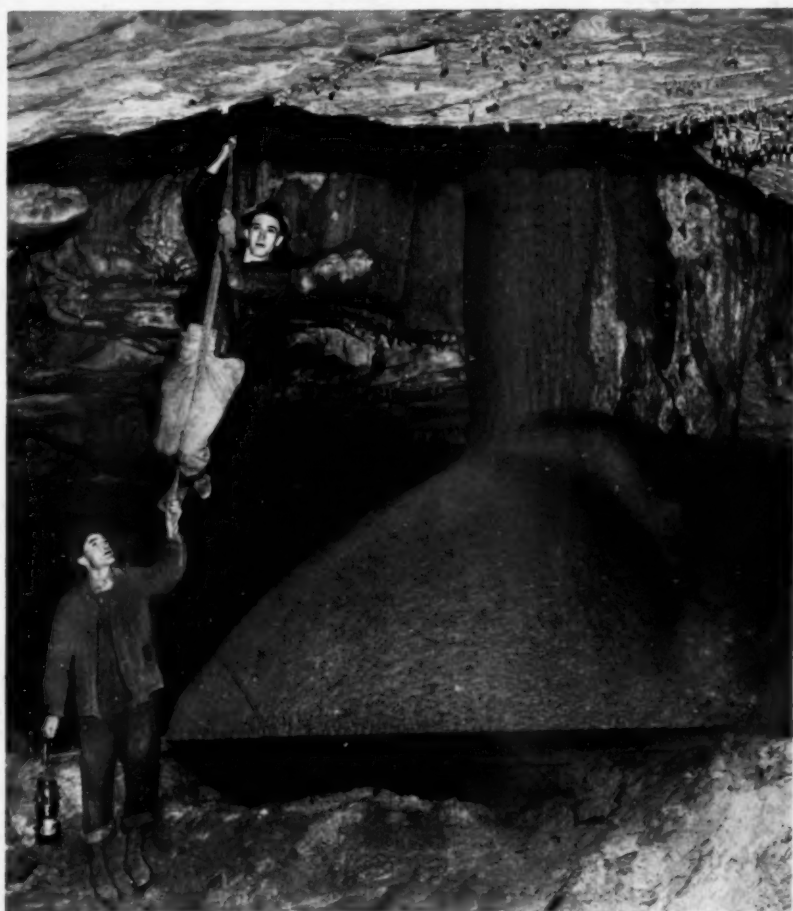
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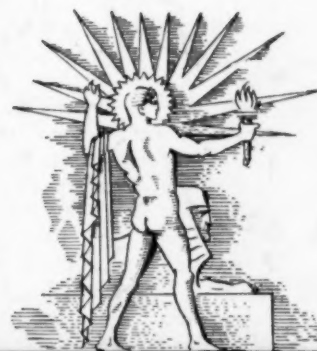
# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



Mushroom Cave

See Page 56



July 27, 1940

A SCIENCE SERVICE PUBLICATION

## Do You Know?

Mental tests were given to college students experimentally about fifty years ago.

Three-fourths of the cost of an average oil well is spent before a drop of oil is produced.

In their useful work of cultivating the soil, *earthworms* tunnel downward three or four feet.

Egg caddlers expertly hold three eggs in each hand, passing them before a spot of light.

A new plastic made from sugar cane bagasse is reported as costing about 4.5 cents a pound.

It has been stated that 12,000 tons of mustard gas were used in the World War, causing 400,000 casualties.

Experiments indicate that lack of common salt in their diet is a cause of quail and other game birds sometimes turning cannibal.

With a view to producing camouflaged homing pigeons for army use, if needed, a California man has bred a line of oddly mottled birds.

In some German cities, owners are required to have wood construction on roofs flame-proofed, to lessen fire danger in air attacks and bomb raids.

What may be the oldest piece of American pewter on record is a fragment of a spoon dated "Chunkatuck 1675" unearthed at Jamestown, Virginia.

## QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

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Of what use is tobacco to a mouse? p. 62.

Norway has been a leading source of Italy's nickel supplies.

Rust proof nails for boats are being made of Monel metal.

Fencing off 15 acres of his farm for wildlife, a North Dakota farmer says: "I believe that providing an area for the nesting and protection of wildlife, grouse, Hungarian partridge, pheasants, and other birds will help me solve some of the insect problems on the farm."

Glass curbs, making highway edges stand out more clearly at night, are being tried in England.

To find ways of preventing peaches from browning, scientists tested 10,000 samples of peaches and used 124 solutions.

By putting apples into a state resembling suspended animation, in gas storage, growers can now market fresh juice apples in early summer or spring.

## SCIENCE NEWS LETTER

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GENERAL SCIENCE

# Rescue Being Sought For Anti-Fascists in France

## Mexico Takes Lead in Offering Asylum to Exiles Now In Danger Through Nazi Pressure on Conquered Land

ONE OF the world's largest rescues of political refugees, some 165,000 anti-fascists caught in capitulated France, is being planned, with hope that they may be evacuated from the Old World and brought to the Western Hemisphere.

Most important step so far is the action of the Mexican government in extending its diplomatic protection to all alien anti-fascists in France threatened by the terms of the French armistices with Germany and Italy. President Cardenas of Mexico himself initiated the measures necessary to allow Mexican consulates in France to give visas to such refugees, many of them intellectuals of international fame.

Mexico has made representations to the German and Italian governments, it is understood, to allow the removal from France of such anti-fascists, whose very lives are believed to be in danger if they fall into the hands of German and Italian police.

### U. S. Visas Offered

It is also understood that the State Department has forwarded to American consulates in France the names of about 150 prominent anti-fascist professional men and women to whom American visas can be given should they apply.

Of the 165,000 anti-fascists in France, about 160,000 are Republican Spaniards, victims of the Franco victory. These men, women and children have been in concentration camps in France, and they cannot return to Spain under Franco. Among them are probably 6,000 professional men and women, and perhaps 2,000 teachers. There are also between 4,000 and 5,000 other anti-fascists, most of them citizens of the axis powers, who cannot return to their countries. About 3,500 are members of the famous International Brigade of the Spanish war, the rest include those who fled from Germany and Italy for political reasons. Among them are perhaps 1,500 scientists, physicians and engineers.

American organizations have been urging American aid to implement and supplement the Mexican action. Among

the groups active are the American Committee for Democracy and Intellectual Freedom, the United American Spanish Aid Committee, and the Committee on Displaced Psychologists. Active as representatives are Dr. S. A. Mitchell, University of Virginia astronomer, Prof. Roland H. Bainton of the Yale Divinity School, Kenneth Leslie, editor of the *Protestant Digest*, Ralph Raeder and Douglas Jacobs, New York authors.

The possibilities of obtaining the co-operation of the Maritime Commission and the Red Cross in providing transportation of the refugee anti-fascists from France to Mexico are being explored.

### Cuba, Chile, Bolivia

Mexico is also understood to be suggesting to Cuba, Chile and Bolivia that those governments take a similar course of action to its own with regard to the refugees in France.

A petition has been presented to the State Department by the interested groups urging that the United States government offer similar protection to the refugees in France and to cooperate with Mexico in its planned action.

The whole matter of European refugees, particularly those in danger because of anti-fascist leanings, is expected to be discussed at the Havana conference of Pan-American nations. It may be possible to work out there ways and means of getting joint action.

The plight of anti-fascists in France is acute and urgent. When Great Britain and France went into the war, German citizens, even though they were refugees from Nazism, were generally put in concentration camps. There was danger that Nazi spies might be posing as refugees. So when France fell, the enemies of Hitler were conveniently to be found in these camps. The armistice terms required that they be handed over upon demand. No doubt Hitler and Mussolini would wreck vengeance upon these exiles who have fought totalitarianism from French soil. It is such a fate that the present effort is intended to prevent.

A classic case of protection being afforded to political refugees is the action of the Chilean Embassy at the fall of Madrid. About 70 or 80 Republican leaders wanted by Franco were taken into the Chilean Embassy just before the city fell, given Chilean diplomatic status and eventually gotten out of Spain.

*Science News Letter, July 27, 1940*

METEOROLOGY

## Weather Robots Planned For Inaccessible Spots

AUTOMATIC weather observing stations, untouched by human hands for months at a time, may soon be scattered around on high mountain peaks or at inaccessible sea locations so that Uncle Sam's weathermen can have complete and automatic radio reports on the changing weather, necessary for predictions.

A radio weather robot, developed by two national Bureau of Standards radio engineers, Harry Diamond and Wilbur S. Hinman, Jr., with the cooperation of the Naval Bureau of Aeronautics, has undergone a successful two-months test at Naval Air Station near Washington, D. C.

Radio messages that it sends out at predetermined intervals tell the barometric pressure, air temperature, relative



**ROBOT OBSERVATORY**

*This compactly housed equipment can keep unsupervised watch over the elements in lonely spots, reporting its observations automatically by radio.*



humidity, wind direction and velocity, rainfall and other meteorological factors.

A mechanical cousin to the high-flying radiosondes now extensively sent aloft by means of unmanned balloons for upper-air weather information, the new robot weather station is designed for stationary installations. It is actually simpler than the radiosonde type of weather observing machine.

By operating on a relatively low frequency, signals from the automatic

weather station can be received with any standard receiver. Even through severe static interference, it will only be necessary for the operator, with stopwatch, to listen in and count the number of signals received in a given time. These can be decoded into the values of the various weather factors automatically observed at the distant place. In some cases automatic recording receivers may be used.

*Science News Letter, July 27, 1940*

#### AERONAUTICS

## Model Plastic Airplanes Are Now Being Developed

**Made of Plywood, Bonded With Synthetic Resin,  
New Planes Are so Smooth That Speed Is Boosted**

**F**OUR aircraft companies and two research laboratories are aggressively attacking the problem of molding airplanes out of plastics for American defense. (*Modern Plastics*, July)

Army, Navy and civil aviation authorities, and the airplane industry in general, are watching these experiments to determine the place of synthetic resins in the future of aircraft.

So far the use of resins has been limited to experimental models of training and light commercial planes, and the quantity production of minor airplane parts.

In airplane structures, such as wings and fuselage, the resins are used very much as glues were in the days of the first World War, with wood veneers used as the reinforcing agent. The molded airplanes are really of plywood resin-bonded construction. Unlike the early glued plywood airplanes, the resin-bonded modern craft are said to be stable and unwarped under all atmospheric conditions, free from internal strains and proof against molds, fungi, water, oil and gasoline.

A five-place Fairchild Model 46, with molded fuselage and wood wings with resin-bonded plywood covering, was first flown three years ago and is today in active service. The Fairchild-owned Dura-mold Aircraft Corporation has a new molding process that uses a rubber bag as one half of the form. The other non-flexible half is made of sheet steel, cast metal or wood. The advantage of this method is that the flexible die assures equal pressure over all surfaces whether curved or not, which is not possible with conventional hydraulic or mechanical

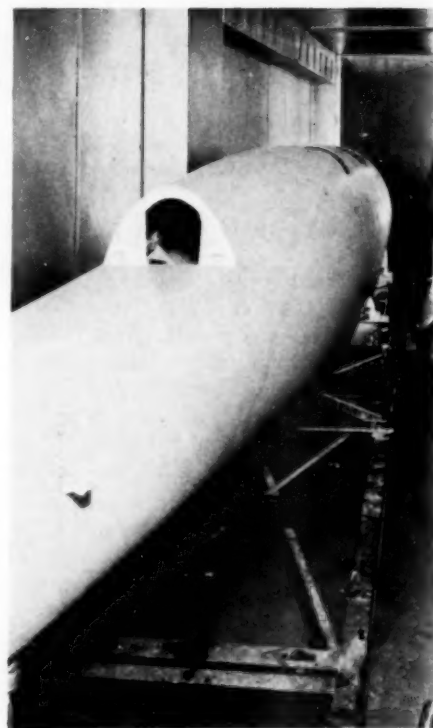
presses. Fairchild PT 19 training ships now in quantity production use plastic plywood spars which are said to be less costly and stronger than solid spruce.

The Summit plane, now undergoing government tests, was molded by Aircraft Research Corporation of Bendix, N. J., and is believed to be the first completely molded airplane body in the world. Wings, fuselage, tail assembly and controls were molded as complete structures. It is claimed that whereas a commercial plane with a 75 horsepower motor will cruise at 95 miles per hour, the Summit plane similarly powered will cruise at 125 miles per hour because all surfaces are smoother. The Vidal process used employs thermosetting and thermoplastic types of resins for bonding plywood veneer. The same manufacturing methods are being used to make boats, skis, racquets, and automobile parts.

Its first plastic-plywood airplane, a primary trainer, was flown recently by the Timm Aircraft Co. of Van Nuys, Calif. In properly contoured forms, spruce veneers are superimposed one upon another, using a thermosetting phenolic resin applied on each layer during assembling.

A fellowship on plastic airplane construction has been established at the Mellon Institute, Pittsburgh, by the Glenn L. Martin Co., looking toward the mass production of airplanes from plastics instead of by the slower riveting and welding of metals.

In the plastics section of the National Bureau of Standards there is a research group working on a National Advisory



**READY TO BAKE**

*A molded plastic airplane fuselage stands in a huge oven, ready to receive its treatment of strengthening heat.*

Committee for Aeronautics project to develop factual information on the physical properties of reinforced plastics. Eighteen synthetic resins for impregnating and bonding wood veneers have already been tested.

In dozens of minor ways plastics are entering into aircraft. Instruments have phenol-formaldehyde housing. Windows in transport and military planes are made of acrylic resin sheets. Propellers are made from wood laminated with plastic. Coatings are made of synthetic resins.

*Science News Letter, July 27, 1940*

The African sausage tree, planted for ornamental purposes in Florida and California, has long, sausage-like fruits weighing about 15 pounds.

## ● RADIO

Dr. Edward E. Wildman, consultant in charge of the tree ring study for amateurs being undertaken by the American Philosophical Society's Committee on Education and Participation in Science, in the Philadelphia area, will be guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, Aug. 1, 4:00 p.m., EDT, 3:00 EST, 2:00 CST, 1:00 MST, 12:00 PST.

Listen in on your local station. Listen in each Thursday.

ASTRONOMY—GEOLOGY

# Saturn-Like Ring May Have Caused Permian Glaciation

**Wreckage of Hypothetical Second Moon, Shading Tropics, Could Have Produced Sufficient Cooling to Start Ice Sheets**

SOME 200,000,000 years ago the earth had a second moon, which broke into pieces. These formed a ring around our planet, like that now around Saturn. This shaded the equatorial regions of earth, cooling them sufficiently to cause tropical glaciers, in which ice flowed toward the poles.

Such, in brief, is the theory proposed by Ronald L. Ives to explain the large areas of ice which, geologists have found, covered large areas in the tropics during the Permian period. This lasted for about 30,000,000 years, ending around 190,000,000 years ago. The Ives theory is explained in a paper in the July issue of the *Journal of the Franklin Institute*.

## Four Ice Ages

Records have been found of four different ice ages, and three of them can be explained by a general cooling of the earth's surface. Such cooling has been caused, it is suggested, by increased volcanic activity, which threw large quantities of dust high into the atmosphere, where it screened the sun's rays from the earth as a whole. With world-wide temperatures reduced, the ice from the polar regions extended nearer to the tropics.

But evidence for glaciation in the Permian period has been found in and near the tropics, particularly India, central and South Africa, Australia and South America. There is also evidence that the ice at this time flowed away from the equator rather than toward it.

To explain this geological mystery, Mr. Ives proposes that earth once had a second moon, which he calls "Ephemer-on." This, he thinks, was much smaller and nearer than the present moon, and revolved, approximately, over the equator. It may have been a minor planet, "captured" as it happened to approach the earth's gravitational field. Then, like the inner moon of Mars, it may have traveled around even faster than the planet revolved. Under these conditions, the same forces that cause tides would have pulled it nearer to earth.

Finally it would have come within about 12,000 miles, the "Roche limit;"

it was so close that the tidal forces of the earth on Ephemer-on would have shattered it into small pieces. These would continue to revolve around the earth, giving us a ring like that of Saturn's, which, it is supposed, had a similar origin. At last the ring would disintegrate. Continuing tidal action, as well as collisions of the pieces with each other, would gradually pull them down, causing a continual rain of particles into the atmosphere.

"This, during nights in the early Permian, must have produced extremely spectacular meteoric effects, resembling a rain of fire in the upper atmosphere over the equatorial regions," says Mr. Ives.

In the unknown period of time while the ring was in existence, it would have partially shaded from the sun's rays what are now the tropics, cooling them to such a low temperature that ice would have covered large areas. What are now the temperate regions would have been warmer, on the average, and the ice would have tended to flow in those directions.

## Watch Saturn

As a test of his theory, Mr. Ives suggests that careful watch be kept of the rings of Saturn, which may be found gradually diminishing in size, then disappearing. It is also possible, he says, that Phobos, the inner moon of Mars, and the innermost one of Jupiter, may be eventually turned into rings.

"In the very distant future," he says, "as (and if) the solar system 'runs down,' earth may capture some wandering mass of cosmic junk and again acquire a ring like that postulated to explain the Permian glaciations. Speculation concerning the time of capture of this as yet unknown body is futile, for exact data, or even sufficiently detailed hypotheses, upon which to base the reasoning, are not now in existence.

"According to a number of theories, notably those of Jeffreys and Darwin, the moon will ultimately be drawn toward earth by tidal forces, and upon reaching the Roche limit will be broken

up, the fragments forming a ring of small satellites about earth. This ring will probably produce such changes on earth that life in forms resembling the present will be impossible. Calculations suggest that this cataclysm will take place in about eight billion years, an interval about three times that from the 'creation' to the present."

*Science News Letter, July 27, 1940*

CLIMATOLOGY

## Aridity Coefficients Tell Dryness of Climates

HOW DRY is a desert? Is interior Australia more arid than Death Valley, or less?

An effort to find a numerical expression for aridity has been made by Dr. W. Gorczynski, noted Polish climatologist who was in this country when the war broke out last September and who is remaining here until conditions become more favorable for him to return home. Dr. Gorczynski calls his concept the "aridity coefficient."

The aridity coefficient of a given locality is obtained by multiplying a latitude factor by the seasonal temperature range and then multiplying the product of these by the precipitation ratio, which is obtained by dividing the difference between highest and lowest recorded rainfall by average rainfall for a period of 50 years.

Calculating aridity coefficients for various places in this country, the Polish scientist has found that the driest spot in the United States is Bagdad, Calif., on the road from Needles to Los Angeles. Bagdad has an aridity coefficient of 70. One of the wettest spots in the country is also in California: Eureka, in the northern part of the state, with an aridity coefficient of 2.

Driest place on earth, as might be expected, is the interior of the Sahara desert (100); Arabia (80) comes second. The 70 boasted by Bagdad, Calif., is intermediate between this and the interior desert of Australia (60). The average aridity coefficient for all North America north of Mexico is 15. The Central American-Caribbean area rates as 7.5. Europe as a whole has an aridity coefficient of less than 10, but rainy Ireland and western Britain come up with a figure of 5.

*Science News Letter, July 27, 1940*

In ten years' search for a parasite to fight the Oriental fruit moth, Connecticut agriculturists have observed insects from Korea, Japan and Australia, as well as native parasites.

PSYCHOLOGY

# Conflict Can Be Eliminated In Community of Nations

Though International Wars Continue, Many Kinds of Strife Known in Earlier Days Have Given Way to Peace

By DR. GEORGE M. STRATTON

Professor Emeritus of Psychology  
University of California

*This timely article was written by Dr. Stratton for Science Service. It gives the substance of his remarks on the occasion of the opening of a new psychology building at the University of California in connection with the meeting of the Western Psychological Association.*

**T**HE PROBLEM of international peace can perhaps most fruitfully be studied in connection with all those great areas of human conduct, where peace has actually been established. And international war can likewise well be studied in connection with other great areas of conduct where peace has not been established at all. And by peace established let us mean that conflicts, serious clashes of purpose, do constantly recur without physical onslaught. We do not mean by peace an absence of opposition of aims.

Between individuals peace is not established in the behavior of childhood and of youth in its early years. Nor is peace found in the behavior of certain exceptional youths, nearly adults, who are delinquents; nor among criminal adults.

## Warlike Primitives

Between groups, large or small, peace is absent completely or is ill-established among the tribes or clans of backward peoples, and among gangs in the underworld of civilized communities, and between organized labor and its employers in some countries, including our own. Nor until recent decades was peace established among certain families in the mountains of our south; as it was not, in earlier years among the powerful feudal families of Italy, Japan, and other countries. And finally, peace is indeed far from established among the independent States of the Society of Nations, in our time, or in any time of history. Their violent conflicts burden the whole world.

But is peace really established anywhere? Yes, and in large areas of human intercourse, both of individuals and of large groups.

Of individuals, their conduct toward one another is peaceful among the vast

majority of the adult fellow citizens of almost any nation of the world—in beligerent countries today, such as Great Britain and France and Germany, as well as in countries not at war, in Sweden for example, or Switzerland, or the United States. Indeed it is only by establishing a firm peace within its own population that any nation can join in waging a terrific foreign war.

And between large groups, peace is established between most of the great bodies of men in mining, industry, transportation, and commerce. The situation is not everywhere as with us. In Scandinavia, for example, there have been in recent years more strikes, in proportion to the number of men in industry there, than in any other countries of the world, and yet with the least of violence in these strikes. Their conflicts are stubborn, but without physical onslaught. Firm peace exists, too, within the British Commonwealth; it is established, we confidently believe, among the States of our Union.

## Areas of Peace

We thus find many areas of human intercourse where peace, in spite of human pugnacity, is well established; and many in which it is not. And it is the task of the social psychologist along with other social scientists, to discern the forces present in all the areas of the one kind and absent in the other kind of area. For in this way we shall find the cause of such an important contrast in behavior.

And first, to speak negatively, I fail to find any pervading economic equality among those who live together without violence, and inequality only among those whose physical fighting is frequent; nor is capitalism present among all fighters and absent among all those who adjust their conflicts peaceably; nor does it appear probable to those who study young boys and savage tribes and sovereign states that all these who are persistently unpacific are also especially neurotic, or subject to uprisings of the unconscious. The "fighting instinct" is clearly present among the peaceable and the violent. Such explanations and others like them seem quite distant from the facts.

What seems close to the facts is this. The individuals or groups that live amicably together are fellow members of a living community, are in habit, emotion and practice, supporters of their community in its essentials, their minds being gradually so shaped by the invisible forces of the community that they feel some mutual respect, and defer to the customs and standards of mutual behavior which prevail wherever the spirit of community is real. For it always favors much accommodation of will to will, rather than much stark insistence on one's own will alone.

Wherever, on the contrary, conflicts frequently end in violence, the contending individuals or groups are not fellow members of a living community which overspans them. If in name and in the eyes of the law they are fellow members as children may be or criminals or criminal gangs of the underworld, one easily detects that they are not fully initiated psychically into their community, are not yet reshaped in mind by its unseen force. As to tribes and clans of backward peoples, these clearly are each psychically apart; no greater company psychically embraces them and calls for a superior loyalty. Sovereign States likewise have but the faint beginnings of fellow membership in a still greater body.

The organized community, then, is the great instrument of peace among its own members. It re-creates them. It reclaims their conduct from its natural readiness to support purpose with physical compulsion guided by self-will.

The re-making of men by the community would thus appear to be the fundamental cause of peace established. The lack or the limitation of such re-making is the fundamental cause of violence, including war. Other factors clearly influence any particular conflict, urging it much or little toward a pacific termination or toward onslaught. But these are of minor consequence. The major factor is the reclamation in the particular area of conduct; or the lack of reclamation.

## Task For Nations

The task set for nations who would establish international peace seems fairly clear in its fundamental character. They cannot be content to be able to win the next war and the one thereafter. Theirs is the far greater enterprise of disestablishing violence in their conduct. And this disestablishment requires them to have it as their central purpose to create a community of nations so interested in the common welfare that whatever gravely befalls anyone of their number does in an important degree befall them all;



whether it be pestilence, flood, earthquake, or an armed attack from another nation. The spirit of all true communities includes this and more. It includes the preparation long beforehand of ways and means to render aid when needed. Spirit and organization—neither of these is vital without the other. The task here set will not be light, nor yet will it be impossible. And the motives to perform it are powerful. For unless the great waste-land of conflict between nation and nation is reclaimed, nations may expect war after war, each more cruel, in its intent than all the wars before it, and more terrible in its instruments.

*Science News Letter, July 27, 1940*

#### PALAEONTOLOGY

### Gigantic Toothed Birds Described in New Bulletin

"SCARCE as hens' teeth" wouldn't have been an apt simile, back in dinosaurian days. Birds had teeth then—plenty of them, and plenty sharp, too. Toothed giants in feathers are featured in a new publication on fossil birds of North America, by Dr. Alexander Wetmore, assistant secretary of the Smithsonian Institution.

One of these nightmare birds was a creature six feet long, built more or less on the lines of a modern loon, that lived in the seas that rolled a hundred million years ago where the plains of Kansas now are. This aquatic monster was practically wingless, but was a powerful swimmer and diver. It must have been a terror to little fishes. Another group of toothed birds were built like gulls, though not directly related to modern gulls. They could fly as well as swim.

These and other birds, belonging to families long since vanished from the earth, were striving for their place in the sun when dinosaurs were still a regnant, but passing, dynasty in the animal world. The real chance of the bird tribe came later, about 60 million years ago, at the turn of an epoch when the great reptiles had become extinct and the mammals, with which birds now share the earth, were also beginning their rapid development.

*Science News Letter, July 27, 1940*

A new method of *marking timber* is to use a paint gun, instead of an axe.

Germany, planning for post-war activities, announces as a primary project a grand-scale *housing* program, with war veterans receiving preference.



#### PLENTY OF TEETH

*If Hesperornis were living today he would certainly be called the Alligator Bird. His great size, expert swimming powers, and long beak lined with rows of sharp teeth must have made him a terror to fishes that swam in Late Mesozoic seas.*

#### MEDICINE

## Zinc Peroxide Treatment Aids in Cancer Cases

SUCCESS in treating painful, foul-smelling, infected ulcers or sores in 35 cancer patients whose condition was so bad they had been given up as hopeless is reported by Dr. Bromley S. Freeman, of the Tumor Clinic at the Veterans Administration Facility, Hines, Ill. (*Journal, American Medical Association*, July 20).

The ulcers or sores had followed X-ray or radium treatment for cancer which in some cases had persisted. Persistence of the cancer after the radium or X-ray treatment was in some cases hidden by the infection in the ulcers. After the zinc peroxide treatment cleaned up the ulcers, it was possible to give more irradiation for the cancerous condition and in some of the cases reported the patients have advanced to the stage where plastic operations can be done to restore bone and other tissue destroyed by the first treatments.

The zinc peroxide treatments relieved pain to the extent that most of the patients could get along with only mild sedatives instead of the morphine or other narcotics they had previously required. The foul odor from these sores, so bad that patients in the next ward complained about it, grew definitely less, in all but one case, starting within 24

hours after the first application of the zinc peroxide.

"Freedom from embarrassment and the return to normal social contacts and interests together with newly acquired confidence and hope have been noted uniformly," Dr. Freeman states in his report of the patients' condition after the treatment. He is now using the zinc peroxide prophylactically to prevent or lessen the frequency or degree of bone destruction following irradiation.

The treatment is for cancers, or sores following their irradiation treatment, occurring on the surface of the body. Among cases reported were those where the ulcers were on the jaw, throat, or mouth. It consists in using the zinc peroxide for dressings on the sores and as a mouth wash in some cases of lip and mouth cancers.

Zinc peroxide is effective in the treatment apparently because when suspended in distilled water it sets free oxygen which destroys certain germs, among them the kinds Dr. Freeman found most frequently in the sores of the advanced cancer patients. He states that after disappointing results with other products, he is using only the special medicinal brand of zinc peroxide.

*Science News Letter, July 27, 1940*

## SAFETY

**Non-Drivers Found Most Liable to Accidents**

**T**HE PEDESTRIAN who knows how to operate an automobile is better able to avoid accidents than his non-driving cousin. This conclusion is reached as a result of reports made to the Highway Research Board.

In Connecticut during 1939 there were 163 pedestrians over 16 years of age killed by motor cars. Only ten of the number were licensed motor vehicle operators. Of the total killed, there were 135 men and 29 women. None of the women were licensed. Most deaths, both for men and women, occurred in the aged 60-69 group.

Records in Wisconsin also show that the non-drivers are most likely to be killed. In that state, 194 pedestrians were fatally injured in 1939. Only 29 of these were licensed. Deducting 46 of the non-drivers who were school children, none of whom was struck at a safety patrol-protected crossing, 81% of the fatalities were non-drivers.

Safety experts consider that these figures show the importance of educating non-drivers, in order to make them familiar with automobile operation.

*Science News Letter, July 27, 1940*

## GEOLOGY

**Immense "Mushroom" Found in Mammoth Cave**

See Front Cover

**H**AILED as the greatest discovery in Kentucky's Mammoth Cave since the cave itself was first entered in 1799, the wonders of a large new area of underground scenery have been officially announced by the National Park Service. The Giant Mushroom owes its 15-foot-tall stem and its 10-foot-in-diameter inverted cap to the joining of stalactite dripping from above with compound stalagmite forming below.

In the picture on the front cover, two of the four discoveries of the new area demonstrate dropping from a rope into the avenue. It was by slow and often hazardous squirming, climbing, jumping, and digging that they penetrated the new region. The public will probably get first sight of the discoveries in two years, following National Park Service studies of trail construction, safe entrances and exits, lighting, and preservation of the formations, many of which are delicate.

Gypsum flowers in the fairy-like "gardens," a feature of the new area, have

varied shapes. They can be produced only under critically balanced conditions of solution and evaporation.

Guides were seeking blind fish for exhibit up Roaring River, in October, 1938, when they decided to "do a little explorin'" and ventured through a long and narrow stoopway. Surveyors, who have since examined four miles of the find, hope to strike a good short cut for the public from the well-known part of the cave.

*Science News Letter, July 27, 1940*

## PHYSICS

**New Automatic Analyzer Speeds Work With Metals**

**A**N AUTOMATIC machine which rapidly and accurately analyzes various materials, an invention expected to prove of tremendous value in accelerating the inspection of metals and alloys in the nation's defense program, has been developed by Prof. George R. Harrison and his associates at the Massachusetts Institute of Technology.

The device, known as an automatic high-speed recording spectrophotometer, not only analyzes materials, as does the spectroscope, but quickly draws the graphs and curves depicting the results of its analysis. It completes the entire process for a given sample in about 100 seconds—less than two minutes.

Heretofore, scientists have used a spectrograph to analyze the material but they have then been forced to interpret this analysis on other machines, a procedure which often required half-a-day or more. The new device makes, records and interprets 20 measurements a second, doing so with an accuracy of one part in a hundred.

The device covers a broad spectral range, making its investigations not only in the visible range of the spectrum but also in the infra-red and ultraviolet regions. It is fairly simple in its operation and, according to Dr. Harrison, could easily be adapted to other similar problems.

Because of the speed at which the device operates, it is especially useful also in studying the progress of chemical reactions. This should be very valuable in such physiological problems as those involving vitamins, hormones and other biochemical substances.

One of the secrets of the apparatus is the use of the methods of television in the form of an electron-multiplier tube in measuring light intensities and a "memory device" to translate various measurements.

**IN SCIENCE**

## NUTRITION

**New Food Tables Aid Diet Experts**

**A** NEW SET of tables giving the approximate composition of American food materials has just been issued by the U. S. Department of Agriculture. The first such tables were issued in 1896 and a revised and expanded edition of this early set was issued in 1906 and has served as the standard ever since.

A glance through the 1940 tables shows many newcomers among American foods. Passion fruit and papaya are probably still unfamiliar to large numbers of Americans, but such 1940 breakfast standbys as grapefruit and some of the ready-prepared cereals, "puffed" and otherwise, were no doubt equally unfamiliar in 1906, if they appeared on breakfast tables at all. The new tables include such items as these as well as the old familiar pancake flour and sausages.

The tables give the percentages of water, protein, fat, ash, and carbohydrates (sugar or starch) of each of the foods and the fuel value in terms of calories both per 100 grams and per pound.

The present widespread popular concern over food values and diets will probably make these tables interesting to many lay diet planners, but their greatest usefulness will be for professional dietitians.

*Science News Letter, July 27, 1940*

## PHYSICS

**Uranium Releases Power Without Human Aid**

**A**TOMIC power is released from uranium spontaneously without atom-smashing bombardment with neutrons, two Leningrad physicists report (*Physical Review*, July 1). However, the observations of the two Soviet scientists, Flerov and Petrjak, hold out no hope that there will be any practical utilization of this energy from the splitting of the uranium atom. Only six fissions an hour were discovered.

*Science News Letter, July 27, 1940*



# THE FIELDS

## CHEMISTRY

### Boosts Production Of Synthetic Rubber

**P**RODUCTION of one of the most useful of the artificial rubbers, which is more resistant to oils and solvents used in industry than natural rubber, will be increased with larger yield of acrylonitrile, a chemical essential in its manufacture. B. W. Henderson, manager of the rubber and rubber chemicals division of the American Cyanamid and Chemical Company, announced that their output of acrylonitrile had been doubled and that further increases are expected as the demand grows.

Acrylonitrile is derived from cyanamide. It is combined with butadiene, a petroleum product, in the manufacture of artificial rubber. Still other uses for it are expected to be found with its added availability.

*Science News Letter, July 27, 1940*

## AVIATION

### New U. S. Warplanes To Cost \$7.50 a Pound

**T**HE THOUSANDS of warplanes Uncle Sam is ordering for defense will cost about \$7.50 a pound. The announced goal of 50,000 a year means the production of 500,500,000 pounds of airplanes, engines, and propellers. Cost will be about \$3,500,000,000, a sizable slice of the nation's income. And this does not include the men to pilot them, the bombs they will carry, the extensive ground crews to maintain them, and hundreds of other incidental and essential costs.

These figures are from an authoritative analysis of the program by T. P. Wright, engineering vice-president of Curtiss-Wright Corporation, now specialist to the National Defense Commission. (*Aviation*, July).

Time is of the essence. But there are no wild dreams of great flocks of warbirds overnight or even in a few months. It took Germany four years to go from 4,300 to 31,000 total air strength. It is estimated that an airplane production rate of approximately 2,000 a month, or 24,000 a year, can be achieved in two and

one-half years or by January, 1943. Over 4,000 planes a month, or 50,000 planes a year, can be realized in five years or by July, 1945.

It will require about \$500,000,000 in new plants—some 75,600,000 square feet—to carry out the program. Men needed will be about 800,000, as compared with 100,000 now employed in the aircraft industry. Research will have to be speeded and amplified, because if we do not improve designs as we go along, the planes will be obsolete and easy prey to more advanced production. As we build airplanes we shall have to recapture aviation research leadership from Germany and Italy.

Comparison figures: The cost of aircraft plant expansion, half a billion dollars, is what France spent on her ineffective Maginot line. The cost per pound, delivered, of ordinary popular priced automobiles is about 30 cents, contrasted with the \$7.50 per pound for airplanes.

*Science News Letter, July 27, 1940*

## AGRICULTURE

### Few New Farm Areas Opened By White Men

**F**ARMING in the Western Hemisphere has not materially extended its area over that occupied by Indian farming before the white man came, declares Prof. Carl O. Sauer of the University of California. With the exception of the Far West in North America and the Pampas of Argentina, no really new land, not previously cultivated, has ever been broken in either of the two western continents.

Not only did the Indians realize nearly to the full the geographic possibilities of American agriculture, but they had worked out a series of cultivated plants excellently adapted to all accessible soil and climate types, that excelled contemporary European crops, says Prof. Sauer.

No Old World grain, for example, was equal to the various types of corn originated by Indian breeders. Neither did white men of pre-Columbian days have any root crops that would compare with potatoes or manioc.

Indian cultivation methods, involving numerous irregularly distributed hills rather than straight, even furrows, was better calculated to avoid the evil of all cultivation—erosion. Nevertheless, erosion did take place, and may have played a considerable part in the downfall of more than one native culture.

*Science News Letter, July 27, 1940*

## PSYCHOLOGY

### Blackout Raising New Psychological Problems

**E**NGLAND'S blackout is raising new psychological problems for the scientist. Some of them are pointed out by K. J. W. Craik (*The Scientific Worker*, June).

Serious emotional effects of the continued darkness can be traced to inability to use vision and other senses for warning of danger. Normal confidence, Mr. Craik explains, is largely due to our possessing sense organs that indicate danger before it is too near. If we are standing in the middle of a field we are reasonably certain that we shall receive warning of the approach of a bull or a runaway motor car. Suddenness of approach is startling and fear-producing.

The blackout provides two causes of fear. The senses that normally serve as a sort of antenna warning of danger are limited and strange objects have a way of popping suddenly and unexpectedly into "sight."

Blackouts are also emphasizing the limitations of perception—the way humans "recognize" objects on the basis of very faint cues. This may lead to error in broad daylight, but the mistakes made in inky darkness may be tragic or amusing.

Lamp-posts must have received, and not returned, innumerable apologies in the blackout, says Mr. Craik.

An exceptionally large person could always be recognized in the blackout. His friends collided with him, apologized, stepped aside, walked forward, and still ran into him!

*Science News Letter, July 27, 1940*

## BOTANY

### Many Living Plants Found in Dead Sea

**T**HE DEAD SEA is not so dead as it is commonly believed to be. The usual statement is that no living thing is to be found in its sullen waters. Yet Dr. B. Elazari-Volcani, of the Daniel Sieff Research Institute at Rehovoth, Palestine, has found 17 species of the one-celled lower plants known as algae in sediments brought up from the bottom at a point about 10 miles southwest of the mouth of the Jordan river.

The water in which the specimens were immersed contained nearly one-third of its weight in mineral compounds, mainly the chlorides of magnesium, sodium and calcium.

*Science News Letter, July 27, 1940*

## ASTRONOMY

# Milky Way Now at Its Best

## Great Zone of Hazy Light Seen to be Composed of Billions of Stars When Examined With Telescope

By JAMES STOKLEY

**W**ITH no naked-eye planets shining in the evening sky during August, we have the opportunity of appreciating better more permanent features of the heavens. For instance, at this time of year, we can best see the Milky Way, to which Milton referred as "a broad and ample road whose dust is gold and pavement stars." This description is not only poetic, but accurate as well. The Milky Way does consist of the combined light of countless billions of distant stars. Each one is so far that we cannot see it separately with the naked eye, but all combine to form the band of light. With a telescope, or even a pair of opera glasses, some of the stars are made visible.

### Bright in Sagittarius

The brightest part of the Milky Way, that is, the part where there are most stars, is toward the constellation of Sagittarius, the archer, which is low in the south on August evenings. It is indicated on the maps. These give the appearance of the skies about 10:00 p. m., standard time, on August 1, or 9:00 p. m., August 15. Sagittarius is to the left of Scorpius, the scorpion, in which one finds the ruddy star Antares.

From the south, the Milky Way extends upwards, to a point nearly overhead. In one of its most brilliant parts we find Cygnus, the swan, better recognized, perhaps, as the northern cross. The vertical part of the cross is in the line of the Milky Way with a first magnitude star, Deneb, at the top.

South of the cross is Aquila, the eagle, with the star Altair. West of the cross one finds the most brilliant star seen on summer evenings, Vega, in Lyra, the lyre. Continuing, to the northeastern horizon, we encounter Cassiopeia, the queen, a group with the shape of a letter W.

Only one other first magnitude star is above the horizon these evenings. This is Arcturus, in Bootes, the bear driver, to the west. A good way to locate it is to look first for the great dipper, in the northwest. The bowl is to the left, and in it are the pointers, which, followed upwards, bring us to Polaris, the pole

star. Following the handle of the dipper to the left, we come to Arcturus.

Though no planets are seen in the evening, several appear later. First to rise is Jupiter, which comes up before midnight, in the constellation of Aries. It is so bright that it is easily found. In the first part of the month, this is followed by Saturn, though Jupiter passes Saturn on the 15th, and after that will be second.

Several hours before sunrise Venus ascends, and is far brighter than the others. In fact, on Aug. 2 it is of greatest brilliance, and then can easily be followed into the sky after sunrise. About Aug. 10, one may possibly get a glimpse of Mercury, just above the horizon, shortly before sunrise. Mars, however, is now too near the sun to be seen at all. Incidentally, a pretty sight will be on view in the early morning sky of Aug. 24, when the moon will be near to Jupiter and Saturn.

### Problem to Philosophers

The Milky Way was a great problem to early philosophers. Before 400 B. C., Democritus suggested that it was made up of faint stars, but this was really only a surmise. In 1610, however, Galileo looked at it through his first little telescope, and found that this was indeed the correct explanation. Another great step was made in 1783, when Sir William Herschel first gave the modern in-

terpretation. He showed that the stars are arranged in a great disc-shaped system like a grindstone, and that we are inside it. When we look to the sides of the grindstone, there are relatively few stars; when we gaze to the edge, they are much more abundant. This concentration around the edge gives the effect of the Milky Way.

Modern astronomers have found that this disc includes some 30,000,000,000 stars, and that it is so big that light takes nearly a hundred thousand years to travel across, at the speed of eleven million miles a minute. This system is called the Galaxy, and outside are millions of other galaxies, visible through great telescopes.

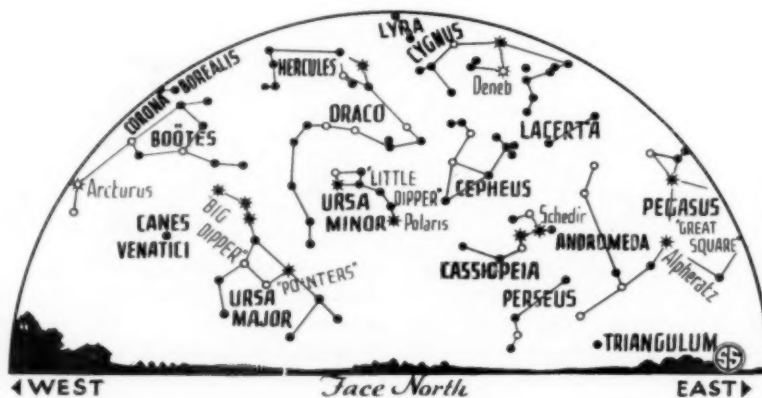
### Month of Meteors

August, usually, is the best time of year to see meteors, or shooting stars, especially about Aug. 11. This is the approximate date of the shower of shooting stars which seems to emerge from the constellation of Perseus. For this reason it is called the Perseid shower.

Actually the meteors, each one scarcely larger than a grain of sand, are moving around the sun in parallel paths. Like the parallel tracks of a railroad, these seem to converge in the distance, and this happens to be towards Perseus.

Every August the earth crosses the swarm, and then meteors are particularly numerous. Vast numbers of them hit our atmosphere, but the friction burns them up, and they disappear in the flash of light commonly called a "shooting star." When they vanish, they are about 70 miles above the ground.

On an ordinary dark night, during



the second half of the year, an average of about a dozen meteors per hour may be seen, but around Aug. 11 they come at the rate of about one a minute.

Sometimes the bright light of the moon seriously interferes, but that will not happen this year. The moon is at first quarter on Aug. 10, when it sets about midnight.

The best display of meteors always comes after midnight, for then we meet them head on. Those we see in the evening must catch up to the earth to be visible, for then we are on the rear of the planet as it hurtles through space.

### Celestial Time Table for August

Times are given in Eastern Standard. Subtract one hour for Central Standard, two hours for Mountain Standard, and three for Pacific Standard. Add one hour for the corresponding Daylight Saving time.

**Friday, Aug. 2, 11:00 a.m.,** Venus greatest brilliancy. **Saturday, Aug. 3, 3:09 p.m.,** new moon. **Monday, Aug. 5, 10:00 p.m.,** moon nearest, 225,800 miles from earth. **Saturday, Aug. 10, 5:00 a.m.,** Mercury farthest west of sun, morning star; 7:00 a.m., moon at first quarter. **Sunday, Aug. 11, Perseid meteors visible.** **Thursday, Aug. 15, 8:00 a.m.,** Jupiter passes Saturn. **Saturday, Aug. 17, 6:02 p.m.,** full moon. **Wednesday, Aug. 21, 5:00 p.m.,** moon farthest, 252,000 miles from earth. **Saturday, Aug. 24, 10:53 a.m.,** moon passes Saturn; 11:33 a.m., moon passes Jupiter. **Sunday, Aug. 25, 10:33 p.m.,** moon in last quarter. **Thursday, Aug. 29, 2:56 p.m.,** moon passes Venus.

*Science News Letter, July 27, 1940*

### RADIO

## Two-Way Communication On Ultra-Short Waves

ULTRA-HIGH frequency radio waves were successfully used in two-way communication over a considerable distance for the first time in experiments by the Mt. Washington Observatory staff. Using a frequency of 225 megacycles, or about 1.3 meters, communication was established at a distance of 90 miles. Hitherto two-way ultra-high frequency radio has been limited to a few miles only. In the present experiments both voice and code were satisfactorily transmitted.

*Science News Letter, July 27, 1940*

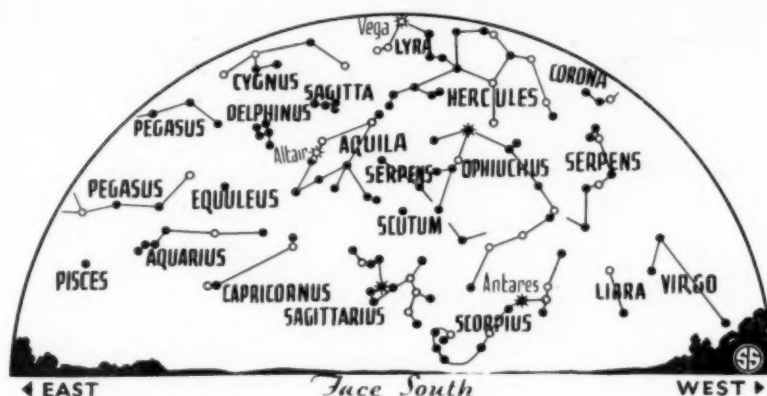
## Earth Trembles

Information collected by Science Service from seismological observatories resulted in the location by the U. S. Coast and Geodetic Survey of the following preliminary epicenter:

**Sunday, July 14, 1:52.7 a.m., EST**

In the Aleutian Island region. Latitude 52 degrees north. Longitude 176 degrees east. Moderately strong shock.

For stations cooperating with Science Service, the Coast and Geodetic Survey, and the Jesuit Seismological Association in reporting earthquakes recorded on their seismographs, see SNL, Feb. 24.



☆ \* ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

### ASTRONOMY

## University of Pennsylvania Acquires Cook Observatory

THE MOST fully equipped amateur astronomical observatory in America will assume professional standing, when the University of Pennsylvania soon takes over the Cook Observatory, at Wynnewood, Philadelphia suburb. Dr. Charles P. Olivier, director of the University's Flower Observatory and professor of astronomy, announced that this bequest by Dr. Gustavus Wynne Cook, its founder who died June 4, had been accepted. Important observational programs which he began will be carried out, said Dr. Olivier.

A complete photographic map of the Milky Way, on plates 20 by 24 inches, was one of Dr. Cook's most ambitious tasks. This was being done with the world's largest "star camera." Photographs have already been made of a little more than half of the Milky Way which can be seen from this location. This will be continued by Lewis I. Tabor, who made the previous exposures, and has now been added to the University's staff, on a part-time basis.

Cooperating with American and foreign observatories in an international program, I. M. Levitt has been observing the sun with special instruments, including a spectrohelioscope, which shows the sun in the light of a single glowing element. Mr. Levitt, of the astronomical department of The Franklin Institute, has also been made a part-time member of the staff of the University, so his work will continue.

Another important instrument is a 15-inch horizontal refracting telescope, with

which Dr. A. M. Skellett, of the Bell Telephone Laboratories, recently succeeded in observing the sun's corona by television. Until recently, it has only been possible to observe the corona at a total eclipse of the sun. The observatory also has a 28½-inch reflecting telescope, which is combined with a 9-inch refractor. The reflector is equipped with a powerful spectrophotograph, for analyzing starlight, and will be used for special problems. A 14-inch Schmidt camera, a new and powerful tool for stellar photography, acquired shortly before Dr. Cook's death, will be used for star observations, and also for meteor photography.

To work with these instruments, two other members have been added to the University's staff. One, full time, is Dr. P. H. Taylor, who has just completed

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the work for his doctorate with Dr. Olivier. The other, part time, is Dr. Roy K. Marshall, assistant director of the Fels Planetarium of The Franklin Institute.

For the present, the observatory will remain on the Cook estate, Roslyn House, but the work will be coordinated with that of the Flower Observatory at Highland Park, a few miles away. Later, it is expected, both observatories will be moved to a new location, but the Cook unit will maintain its identity and Dr. Cook's name will be perpetuated.

Dr. Cook, 72 at the time of his death, was president of the South Chester Tube

Co. and of the South Chester Terminal and Warehousing Co., and a director of a national bank and two trust companies. He received the honorary degree of Doctor of Science in 1936 from the University of Pennsylvania for his astronomical work. In addition to being an amateur astronomer of note, he also had many other interests, for he built ship models, was an enthusiastic amateur photographer, collected rare orchids and rare books. It is estimated that he spent approximately \$200,000 to equip the observatory, over a period of about ten years.

*Science News Letter, July 27, 1940*

gun in both directions of motion when desired, but which can instantly be released to shift to another target.

To Paul Kollsman, of Stamford, Conn., went patent 2,206,506 for a compass that can be used on airplanes, speedboats or other craft, indicating by a dial on the dashboard. A rather large magnet, hung on a jewelled pivot, and supported by the buoyancy of a liquid surrounding it, responds to the earth's magnetism. Below this are a pair of smaller magnets, which follow the large one. These, in turn, are geared to the hand which moves around the dial, indicating direction.

Captain Leslie A. Skinner, of the U. S. Army, received patent 2,206,057 for a rocket projectile, which, he suggests, may be used for signalling, or for carrying an explosive or incendiary charge, a message or a parachute. In ordinary rockets burning black powder, the flow of gases to propel the rocket can be discharged through a hole of fixed size. More powerful nitrocellulose explosives used by Captain Skinner for the driving force require high pressure to start the ignition. When the pressure increases, the burning rate also is raised. Thus, it is necessary to regulate the pressure as the burning takes place. This is done by discharging the gases through a small opening made in solder, or some other material having a low melting point. The diameter of the hole is increased, and the pressure reduced, as the rush of hot gases melts away the lining of the opening.

The day when participants in a telephone conversation will be able to see each other may be brought nearer with the invention of Dr. Vladimir K. Zworykin, of Philadelphia, granted patent 2,206,654, by which two-way television may be accomplished over a single pair of wires. Essentially this consists in sending both ways over the wires at once. A blurred image, like a photographic double exposure, would normally be obtained at each end. Dr. Zworykin provides "blanking out" amplifiers at each end of the line, which permit the transmitting tube to send and the viewing tube to show only alternate pictures in the series that is constantly coming over the line. These automatically switch back and forth so that first a picture is sent in one direction, then one goes in the opposite direction. All this is so fast that the persons at each end see a continuous picture, though not with as good quality as if the transmission were continually in the same direction.

*Science News Letter, July 27, 1940*

Turtle shells were cradles for Indian babies in Lower California.

#### INVENTION

## Latest Patents Include Airplane Gun Turret

### Gunner Is Protected From Wind, Yet Can Turn and Aim His Weapon as Freely as Was Possible on Open Mount

**L**ARGE caliber machine guns can be fired from modern high speed airplanes with greater accuracy than heretofore, using a flexible gun turret invented by Clem G. Trimbach, Eggertsville, N. Y. and Camille R. Lemonier, Kenmore, N. Y. They have just been granted United States Patent 2,206,065 for the device.

In older planes, the machine gunner was exposed, and could aim in all directions. However, as the patent states, "it has been found in practice that the conventional flexible gun mounts of the past have been found inadequate in present high speed aircraft, due to the terrific air reactions on exposed parts of the mount by which the gunner is prevented from accurately training the gun and holding an aimed position. Since the use of a flexible gun mount in aircraft is mandatory from a military standpoint in certain types of craft, the present invention pro-

vides for full flexibility, and by its organization, will enable a gunner to maintain an accuracy of fire even better than that which was obtainable in the older type gun mounts used on low speed aircraft."

The gun is pivoted at the center of a hemispherical dome made of transparent plastic material. This can turn around its base, so that the gun, pointing through it, may be moved from side to side.

Up and down motion is arranged without an open slit through which air can enter. The inventors accomplish this with a sliding shutter. When the gun is horizontal, the shutter extends from the barrel to the top of the dome, but as it is aimed higher, the shutter slides on tracks down the other side. Below the barrel is a flexible curtain, wound up on a spring roller, like a window shade, as the gun comes down. There is also a movable seat for the gunner, and a clamp to hold the

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#### WINDOWED WINGS

*We are used to thinking of moths and butterflies as having wings densely covered with powdery scales, and hence opaque. Some members of this family, however, have at least parts of their wings as transparent as those of dragonflies or cicadas. Through the wings of this one you can distinctly see the letters of the page on which it is resting.*

#### PSYCHOLOGY

## Lacking Parts of Brain, Monkeys Still Use Tools

**E**VEN with part of their brains missing, monkeys, who are admittedly not tool-using humans, can nevertheless handle rakes with agility and undoubted reasoning in order to reach a luscious banana.

In the latest psychological experiments on Columbia University monkeys, Prof. C. J. Warden has demonstrated that even when deprived of the frontal lobes of their brains, acknowledged seat of higher thinking, monkeys can use one rake to pull in another rake, even up to eight rakes, in order to get food that they want.

There is little chance that monkeys can be put to useful tasks in this world. But these experiments are telling psychologists important facts about the brain and its workings in the tailed relative of man.

Psychologists have formerly considered such use of a number of tools in combination as a monopoly of human beings and our close relatives among the higher, tail-less apes.

Without their brains intact, however, the monkeys are baffled by still more complicated tasks conquered by them when they were normal.

Prof. Warden found that not only can both Old World and New World monkeys learn to use a series of rakes to pull in food placed out of their reach, but they can "remember" this ability after a lapse of two years or more. Incidentally, the New World monkey, the cebus, is most clever at the trick, although the Old World rhesus is the most closely related to man.

Two years after the monkeys had mastered the use of as many as eight rakes in series to pull in their food, the problem was made more difficult for them. The rakes were placed on two and sometimes on three platforms, each on a different side of the cage, so that the monkey had to bring them into the cage and push them out through the bars onto another platform in order to pull in other rakes

with the food. They also had to judge the lengths of the rakes and put them together in a certain order.

On this complicated task using three platforms, the rhesus monkeys learned to use a seven-rake series and a cebus monkey was able to master an eleven-rake series.

Loss of both the frontal lobes of the brain did not break up the ability to manipulate the rakes in series when they were on a single platform. But ability to work from more than one platform was seriously disturbed. On the two-platform set-up, the brain-deficient animals were able to use only two rakes, and on the three-platform set-up, they failed altogether.

This finding throws new light on the function of the frontal lobes, recently the subject of much discussion because some human patients who have lost this important brain area through disease or injury have scored higher on intelligence tests than they did before the loss.

*Science News Letter, July 27, 1940*

#### PHYSICS

## Thickness of Paint Measured Magnetically

**A** LAYER of paint or other non-magnetic coating on a sheet of iron can be accurately measured for thickness even though less than a hundred thousandth of an inch, using a new magnetic device. A short iron rod, with two coils of wire on it, is pressed against each side of the coated iron sheet. As both are magnetized, by current through one coil of each, current is induced in the other coils. But the coating reduces the current on that side, and measuring the difference gives the thickness.

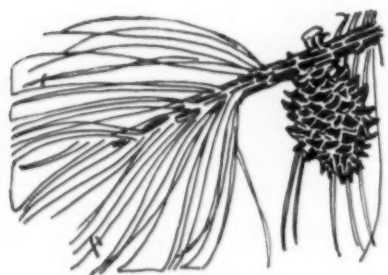
*Science News Letter, July 27, 1940*

#### PHYSICS—BACTERIOLOGY

## Ultraviolet Barrier Stops Germs at Doors

**A** GERM-killing ultraviolet lamp a yard long, which can be placed above a doorway where it forms an invisible screen through which germs cannot enter, has been announced by the General Electric Company. Secret of the germicidal power is that it copiously emits rays of wave length 2537, which are extremely lethal to bacteria. These rays are invisible, but the lamp shines with a faint bluish light, to show that it is on. The 36-inch lamp consumes 30 watts of power.

*Science News Letter, July 27, 1940*



### Blitzkrieg Against Fire

**B**LITZKRIEG methods, with streamlined fighting units instead of old-time mass formations, are coming into use in combating one of America's worst economic menaces, the forest fire. Tried out for the first time last year by the U. S. Forest Service, the new tactics proved so satisfactory that their use is now being extended.

Traditional method for stopping a forest fire has been to round up casual laborers and even hoboes by hundreds, arm them with tools which they hardly know how to use, and send them to the fire front. Unsited for the work, usually in poor physical condition, these men naturally work inefficiently, especially under the terrific stress and danger of a forest fire battle. Furthermore, the method of recruiting involves delay, frequently of days, while the fire rolls forward unchecked.

The new tactics involve the building of what amounts to a small standing army, skilled in the use of their weapons, kept in perfect physical trim and ready for instant action. Formations are in companies of 40, each divided into squads of 10. The men are permanently on the payroll; when not fighting fires they are kept busy building roads, bridges, etc. The original 40-man crew, that went into action last year, averaged nearly six feet in height and 170 pounds in stripped weight.

Instead of having each man try to clear and hold one short section of line, such a company moves steadily forward. Each man strikes one blow, with ax or other tool, for every couple of strides he takes. Those following do the same, so that by the time the 40 have passed there is a swath of ground cleared

of everything combustible, and the fire cannot pass.

The forties constitute a *corps d'elite*, sent into the toughest spots and taking pride in their ability to lick the hungriest

fire. Last season's performance indicates that one of these professionals can clear five times as much fire line in a given time as the untrained fighters hastily recruited after the fire has broken out.

*Science News Letter, July 27, 1940*

### ZOOLOGY

## Wild Mouse Chews Tobacco; Quids Keep Vermin Away

Two Wild Tobacco Species Grow in Native Habitat, So Strange Practice May Not Be Unnatural After All

**A** WILD mouse that chews tobacco for a serious purpose is a pet of Ernest P. Walker, assistant director of the National Zoological Park. The tobacco isn't chewed "for fun," but apparently to provide an insecticide to keep his fur clear of pestering parasites.

The little animal, a grasshopper mouse, lives in a cage on the corner of Mr. Walker's desk in his home. His name is Ony—short for his full zoological title, *Onychomys leucogaster*, which is rather too much name for so small a mouse. Every evening he is given several hours' liberty.

"Frequently I have noticed," reports Mr. Walker, "after he had been running about the desk, that very small cigar stubs which I had left in the ash tray had been carried to his favorite location on the desk and completely demolished.

"My first thought was that he was merely amusing himself; but this explanation did not satisfy me. Recently I offered him one of my small cigar stubs after he had been without such material for a short time. He immediately took it, carried it to his favorite corner, held it in his hands and took a small bite from the end I had held in my mouth. He chewed the morsel briefly and then bent around, separated his fur with his hands and placed the chewed tobacco on his skin at the base of the fur. He took another bite, chewed it briefly and placed it similarly. He did the same thing at various parts of his back, thighs, and under parts. This procedure has since been witnessed by both my wife and myself and by visitors on several occasions.

"As he has been kept well supplied with insect powder, I am confident he has no ecto-parasites; but no doubt he does not distinguish between the common itchiness of the skin that occurs on all furry creatures and the

special irritation caused by parasites.

"When I first noticed that he used the tobacco in this manner, I wondered at the instinct or reasoning that prompted him to do so. Mr. Vernon Bailey, who gave 'Ony' to me, reminds me that two species of wild tobacco normally occur in the general range of this grasshopper mouse. It is therefore possible that the use of tobacco as an insecticide is a normal but hitherto unnoticed habit of the species."

*Science News Letter, July 27, 1940*

Roasted barley supplies Germany with *ersatz* coffee; *ersatz* tea is made from mixed leaves and shoots.

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# •First Glances at New Books

Additional Reviews

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## GEOGRAPHY—ECONOMICS

THE GEOGRAPHIC BASIS OF AMERICAN ECONOMIC LIFE—Harold Hull McCarty—*Harper*, 702 p., \$3.75. The where, what, and particularly the why of the United States' economic development is covered in this college text, which should also prove interesting to many readers concerned with business or trade. For study, the country is divided into ten economic and geographic regions, and the analysis advances from the most easily understood situations to the most complex.

*Science News Letter*, July 27, 1940

## HISTORY

THE ATLANTIC MIGRATION, 1607-1860, A History of the Continuing Settlement of the United States—Marcus Lee Hansen—*Harvard Univ. Press*, 391 p., \$3.50. Taking his viewpoint from Europe's shores, rather than in America, Prof. Hansen shows why Europeans left their homes to people the United States. There is a dramatic, deeply moving epic in the hopes and fears of these millions, and the historian has re-captured the spirit as well as the significant forces of successive eras.

*Science News Letter*, July 27, 1940

## HISTORY

TURKEY AT THE STRAITS, A Short History—James T. Shotwell and Francis Deák—*Macmillan*, 196 p., \$2. Especially timely is this account of the Straits of the Dardanelles and Bosphorus, highly strategic waterways linking the Black Sea and the Mediterranean. Rapidly covering earlier events, the major part of the book deals with diplomacy and treaties of the present century.

*Science News Letter*, July 27, 1940

## ARCHAEOLOGY

THE ANCIENT STONES CRY OUT—Peyton Hervey Ennis—*Biblical Treasures*, 124 p., \$1. A popular account of archaeological evidence which clarifies and upholds Bible narrative. The author weakens his argument by including some doubtful authorities and reaching some sweeping conclusions.

*Science News Letter*, July 27, 1940

## GENERAL SCIENCE

SCIENCE SINCE 1500—H. T. Pledge—*British Library of Information*, 357 p., \$2.15. From the Science Museum in London comes this short history of mathematics, physics, chemistry and biology, with interesting compilations and com-

parisons not found elsewhere. Charts show the connection between teachers and pupils and maps show the birth places of scientists, principally in Europe.

*Science News Letter*, July 27, 1940

## GENERAL SCIENCE

THE PHILOSOPHY OF POWER, First Principles—Donald Murray—*Williams and Norgate, Great Russell Street, London, England*, 336 p., 12s. 6d. This is the first of what is intended to be a six-volume survey of power in the widest possible sense—human as well as mechanical power. As such, this book devotes itself in considerable part to an outline and declaration of what the entire work is to be. A considerable mass of data accumulated but never worked up by the late Dr. E. E. Slosson will constitute a part of one of the later volumes.

*Science News Letter*, July 27, 1940

## ECONOMICS

THE MODERN RAILWAY—Julius H. Parmelee—*Longmans, Green*, 730 p., \$4. An authoritative and definitive treatment of one of America's greatest industries, written by the director of the Bureau of Railway Economics of the Association of American Railroads.

*Science News Letter*, July 27, 1940

## PHYSICS

ELEMENTS OF ELECTRO-MAGNETIC THEORY—A. Wilmer Duff and Samuel J. Plimpton—*Blakiston*, 175 p., \$2.75. Here is an excellent textbook for an intermediate course in physics which contains the major essentials of the fundamental electro-magnetic theory.

*Science News Letter*, July 27, 1940

## PHOTOGRAPHY

PHOTOGRAPHIC FACTS AND FORMULAS—E. J. Wall; revised and largely rewritten by Franklin I. Jordan—*American Photographic Pub. Co.*, 384 p., \$2.50. An excellent reference book for the dark-room shelf of either the amateur or the professional photographer.

*Science News Letter*, July 27, 1940

## ZOOLOGY

AMPHIBIANS AND REPTILES IN NEVADA—Jean M. Linsdale—*American Academy of Arts and Sciences*, 60 p., maps, \$1.85. (Proceedings of the American Academy of Arts and Sciences, Vol. 73, No. 8, May, 1940)

*Science News Letter*, July 27, 1940

## EVOLUTION

THE MATERIAL BASIS OF EVOLUTION—Richard Goldschmidt—*Yale Univ. Press*, 436 p., illus., \$5. A new approach to the old, yet ever fresh problem of evolution. As might be expected from the author's own professional training and background, the approach is primarily genetical. He holds that the neo-Darwinian theory applies only within the species and is no longer tenable as a general theory of evolution. To account for larger changes, he offers a theory based on mutational changes in the hereditary materials controlling reaction velocities in development.

*Science News Letter*, July 27, 1940

## BOTANY

FLORAL MORPHOLOGY, A New Outlook with Special Reference to the Interpretation of the Gynaeceum, Vol. II—E. R. Saunders—*Chemical Pub. Co.*, 473 p., \$4.25. This second volume completes a work (Vol. I published in 1937) which will be of considerable interest to professional botanists, especially in the fields of morphology, taxonomy and phylogeny.

*Science News Letter*, July 27, 1940

## BOTANY—EXPLORATION

TRAVELS OF RUIZ, PAVÓN, AND DOMBEY IN PERU AND CHILE (1777-1788)—Hipólito Ruiz—*Field Museum of Natural History*, 372 p., 2 maps, \$3.50. (Botanical Series, Vol. 21, Publication 467). Botanists, especially plant geographers, will find great interest in this full publication, in good English translation, of the travel diaries of three pioneer Spanish botanists of the eighteenth century.

*Science News Letter*, July 27, 1940

## PALEONTOLOGY

A CHECK-LIST OF THE FOSSIL BIRDS OF NORTH AMERICA—Alexander Wetmore—*Smithsonian Inst.*, 81 p., 30c. (Smithsonian Misc. Coll., Vol. 99, No. 4) See page 55.

*Science News Letter*, July 27, 1940

## GEOLOGY

METAMORPHISM IN THE SOUTHERN SIERRA NEVADA NORTHEAST OF VISALIA, CALIFORNIA—Cordell Durrell—*Univ. of Calif.*, 117 p., illus., \$1.25.

*Science News Letter*, July 27, 1940

## BIOLOGY—CHEMISTRY

AN INTRODUCTION TO BIOCHEMISTRY (2d. ed.)—William Robert Fearon—*Mosby*, 475 p., \$3.75.

*Science News Letter*, July 27, 1940

# •First Glances at New Books

Additional Reviews  
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## MEDICINE

UNTO THE FOURTH GENERATION, GONORRHEA AND SYPHILIS, What the Layman Should Know—Irrving Simons—*Dutton*, 243 p., illus., \$2.50. This book, with its clear and forceful style and its frequent repetition of important points, should do much to help the fight against venereal diseases by giving the layman both necessary knowledge and impetus for taking part in the fight. Drawings and a glossary of medical terms help to make the subject clear.

*Science News Letter, July 27, 1940*

## HYGIENE

THE FUNDAMENTALS OF PERSONAL HYGIENE, Including Their Practical Application to Healthful Living (3rd. ed., rev.)—Walter W. Krueger—*Saunders*, 304 p., illus., \$1.75. Text for high school students which should appeal to them because of its grown-up style.

*Science News Letter, July 27, 1940*

## MEDICINE

CARDIOVASCULAR-RENAL DISEASE—Lawrence W. Smith, Edward Weiss, Walter I. Lillie, Frank W. Knozelmann and Edwin S. Gault—*Appleton-Century*, 227 p., illus., \$4.50.

*Science News Letter, July 27, 1940*

## ANATOMY

FUNCTIONAL HUMAN ANATOMY—Cleveland Pendleton Hickman—*Prentice-Hall*, 501 p., illus., \$3.75. Text book for medical students.

*Science News Letter, July 27, 1940*

## MEDICINE

A SYMPOSIUM ON THE BLOOD AND BLOOD-FORMING ORGANS—E. Meulengracht and others—*University of Wisconsin Press*, 264 p., \$3.50.

*Science News Letter, July 27, 1940*

## MEDICINE

SHOCK, Blood Studies as a Guide to Therapy—John Scudder—*Lippincott*, 323 p., illus., \$5.50. For physicians and medical scientists.

*Science News Letter, July 27, 1940*

## MEDICINE

THE MARCH OF MEDICINE—Edited by the Committee on Lectures to the Laity of the New York Academy of Medicine—*Columbia Univ. Press*, 168 p., \$2. Those laymen who did not have the opportunity of hearing these interesting lectures on medical progress will enjoy

reading the book—and possibly many who heard the lectures will want the book for further study.

*Science News Letter, July 27, 1940*

## MEDICINE

THE 1939 YEAR BOOK OF DERMATOLOGY AND SYPHILOLOGY—Fred Wise and Marion B. Sulzberger, eds.—*Year Book Publishers*, 740 p., \$3.

*Science News Letter, July 27, 1940*

## MEDICINE

JEWISH CONTRIBUTIONS TO MEDICINE IN AMERICA FROM COLONIAL TIMES TO THE PRESENT (2d. ed.)—Solomon R. Kagan—*Boston Med. Pub. Co.*, 792 p., illus., \$3.50. Medical biographies, well arranged and indexed.

*Science News Letter, July 27, 1940*

## MATHEMATICS

METRIC DIFFERENTIAL GEOMETRY OF CURVES AND SURFACES—Ernest Preston Lane—*Univ. of Chicago Press*, 216 p., \$3. "This book is designed as a text for first-year graduate students of metric differential geometry and for independent reading. Plane analytic geometry, three dimensional analytic geometry, and calculus are prerequisite for understanding the developments, but vectors are not used."

*Science News Letter, July 27, 1940*

## RADIO

GETTING ACQUAINTED WITH RADIO—Alfred Morgan—*Appleton-Century*, 285 p., illus., \$2.50. In the first parts of this book the fundamentals of radio are given, while the second part is more concerned with information for radio amateurs, including suggestions and instructions on how to obtain a transmitting license.

*Science News Letter, July 27, 1940*

## PHYSICS—CHEMISTRY

THE PHYSICAL SCIENCES—Emmett James Cable, Robert Ward Getchell and William Henry Kadesch—*Prentice-Hall*, 754 p., illus., trade, \$5; school, \$3.75. This book should be useful as a text for a college survey course, or for the general reader who wishes to cover the field. Reading references, and questions for each chapter, are contained in appendices.

*Science News Letter, July 27, 1940*

## MEDICINE

IMMUNE-BLOOD THERAPY OF TUBERCULOSIS—Joseph Hollós—Bruce Humphries, 197 p., \$2.50.

*Science News Letter, July 27, 1940*

## HOME ECONOMICS—CHEMISTRY

THE CHEMICAL COMPOSITION OF FOODS—R. A. McCance and E. M. Widdowson—*British Library of Information*, 150 p., \$1.20. (Medical Research Council, Special Report Series, No. 235) Designed primarily to assist British physicians, nutritionists and others concerned in prescribing diets for sick persons, this book will undoubtedly appeal to those laymen in America and England who are curious about the chemical composition of the foods they eat. If you have a yen to know how much iron, or fat, or sugar, or other chemicals you get out of an apple dumpling, for example, you will find the answer here, together with the recipe for the apple dumplings whose chemical composition was determined. For those whose interest is more serious, the book will prove extremely useful.

*Science News Letter, July 27, 1940*

## ENGINEERING

PUBLIC WORKS ENGINEERS' YEARBOOK, 1940, Including the Proceedings of the 1939 Public Works Congress, Held at Pittsburgh, Pa., Oct. 9-11, 1939—*American Public Works Assoc.*, 338 p., \$3.50. The papers included here cover such subjects as sewage disposal, traffic control, street paving and city planning. There is also a list of the members of the American Public Works Association.

*Science News Letter, July 27, 1940*

## ENGINEERING

FUELS AND THEIR UTILIZATION—A. R. Carr and C. W. Selheimer—*Pitman*, 180 p., illus., \$2. The various fuels used in current practice, methods of their utilization, tests to increase and maintain efficiency in their use, are discussed in this new book.

*Science News Letter, July 27, 1940*

## ELECTRICAL ENGINEERING

INDUCTION MOTORS—S. Gordon Monk—*Chemical Pub. Co.*, 126 p., diagrams, \$2. The fundamental principles of induction motors, as well as their applications, are described in this concise British work.

*Science News Letter, July 27, 1940*

## EXPLORATION

EXPLORATIONS AND FIELD-WORK OF THE SMITHSONIAN INSTITUTION IN 1939—*Smithsonian Institution*, 96 p., Free upon direct application to Smithsonian Institution, Washington, D. C.

*Science News Letter, July 27, 1940*